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(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 264 878**
A1

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **87115256.7**

(22) Date of filing: **19.10.87**

(51) Int. Cl.4: **C09B 62/09** , C09B 62/513 , D06P 1/38

(30) Priority: **20.10.86 JP 247482/86**

(43) Date of publication of application: **27.04.88 Bulletin 88/17**

(84) Designated Contracting States: **CH DE GB LI**

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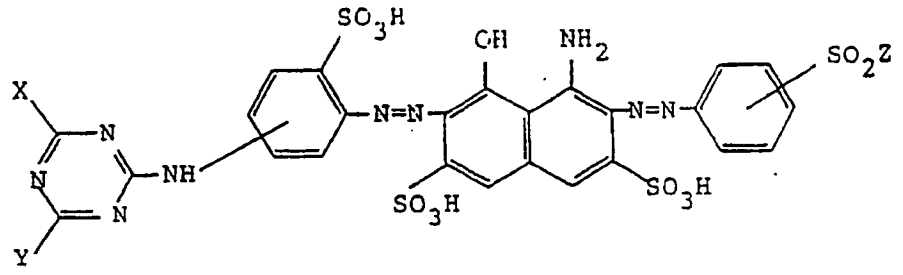
(54) Water-soluble disazo colorants.

(57) A water-soluble disazo colorants represented, in the form of the free acid, by the formula (I)



(I)

wherein, X represents a halogen atom; Y represents a chlorine atom or a group represented by $-OR^1$, $-SR^1$, $-O-R^2-OR^3$ or $-S-R^2-OR^3$ (wherein R^1 represents an alkyl group which may be substituted by a hydroxyl group, a cyano group or a halogen atom, or an alkenyl group; R^2 represents an alkylene group and R^3 represents an alkyl group which may be substituted by a hydroxyl group); and Z represents $-CH=CH_2$, $-CH_2CH_2Cl$, or $-CH_2CH_2OSO_3H$.

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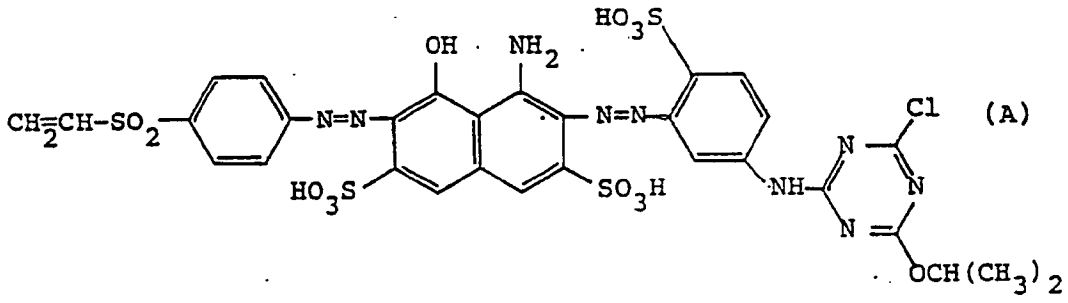
WATER-SOLUBLE DISAZO COLORANTS

This invention relates to navy blue-series water-soluble disazo colorants having novel structure. Mor particularly, the invention relates to water-soluble disazo colorants which have a vinylsulfone type reactive group and a mono-or di-halogenotriazine type reactive group in the structure and, in particular, in the case of using as dyestuff for cellulose or nitrogen-containing fibers, are excellent in various color fastnesses and level dyeing and also can give densely dyed products.

In the case of dyeing cellulose fibers or nitrogen-containing fibers, water-soluble reactive dyestuffs are usually used and the reactive dyestuffs are required to have the properties of excellent in level dyeing, and capable of providing densely dyed products having good properties in various color fastnesses. The characteristics of such reactive dyestuffs are delicately varied according to the fundamental skeleton, the kinds of substituents, the kinds of reactive groups, and a combination thereof and dyestuffs having various structures have hitherto been proposed. As the results thereof, dyestuffs having a considerably satisfactory level have been practically used at present.

However, in the case of reactive dyestuff having a navy blue tone, dyestuffs having excellent characteristics in various points have never been found.

For example, JP-A-118459/86 discloses navy blue series reactive dyestuffs shown by formula (A) but this dyestuff is not always satisfactory in color fastness to chlorine and perspiration under sunlight.

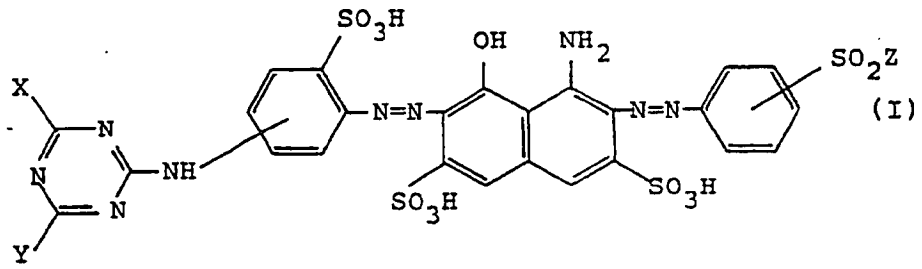


(A)

That is, conventional dyestuffs of navy blue tone are frequently insufficient in various color fastnesses in the case that they show good level dyeing property or on the contrary, they are frequently inferior in level dyeing property in the case that they are excellent in color fastnesses. Also, these reactive dyestuffs are not sufficient in build-up property.

The object of this invention is, therefore, to provide reactive colorants of navy blue series tone excellent in level dyeing property, densely dyeing property, build-up property and various fastnesses to sunlight, chlorine, perspiration under sunlight, etc.

That is, according to this invention, there are provided water-soluble disazo colorants, represented in the form of the free acid, by the following formula (I)



(I)

wherein, X repres nts a halogen atom; Y represents a chlorine atom or a group represented by $-OR^1$, $-SR^1$, $-O-R^2-OR^3$ or $-S-R^2-OR^3$ (wherein R^1 repr sents an alkyl group which may be substituted by a hydroxyl group, a cyano group or a halogen atom, or an alkenyl group; R^2 represents an alkylene group and R^3 represents an alkyl group which may be substituted by a hydroxyl group); and Z represents $-CH=CH_2$,

$-CH_2CH_2Cl$, or $-CH_2CH_2OSO_3H$.

The present invention is explained in detail below.

In the water-soluble disazo colorants of this invention shown by formula (I) described above, examples of the halogen atom shown by X are usually a fluorine atom, a chlorine atom, and a bromine atom and, in particular, are preferably a fluorine atom and a chlorine atom.

Y represents a chlorine atom, $-OR^1$, $-SR^1$, $-O-R^2-OR^3$ or $-S-R^2-OR^3$ as described above, and examples of the alkyl group shown by R^1 and R^3 are a straight chain or branched alkyl group having 1 to 8 carbon atoms, such as a methyl group, an ethyl group, a propyl group, a hexyl group, an octyl group or are, preferably a straight chain or branched alkyl group having 1 to 4 carbon atoms, such as an ethyl group or a propyl group. Furthermore, the alkyl group shown by R^1 may be substituted by a hydroxyl group, a cyano group or a halogen atom and specified examples of these substituted alkyl group are a 2-hydroxyethyl group, a 4-hydroxybutyl group, a 2-cyanoethyl group, a cyanomethyl group or a 3-chloropropyl group. Also, the alkyl group shown by R^3 may be substituted by a hydroxyl group and specific examples of the substituted alkyl group are a 2-hydroxyethyl group or a 4-hydroxybutyl group.

Examples of the alkenyl group shown by R^1 are an alkenyl group having 3 or 4 carbon atoms, such as an allyl group or a 2-butenyl group.

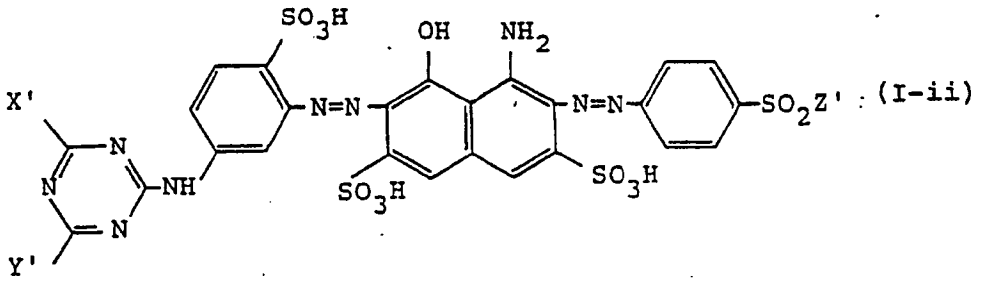
Examples of the alkylene group shown by R^2 are an alkylene group having 1 to 4 carbon atoms, such as a methylene group, an ethylene group, a propylene group or a butylene group.

Y is preferably $-OR^1$ or $-O-R^2-OR^3$ (wherein R^1, R^2, and R^3 have the same significance as defined above in formula (I)), more preferably $-OR^1$ or $-O-R^2-OR^3$ (wherein R^1 and R^2 are an alkyl group having 1 to 4 carbon atoms and R^2 is an alkylene group having 1 to 4 carbon atoms), and most preferably $-OR^1$ (wherein R^1 is an alkyl group having 1 to 4 carbon atoms).

In formula (I) described above, the group shown by $-SO_2Z$ may be substituted to any optional position of the benzene ring with respect to the bonded position of the azo group but is particularly preferably bonded to the para-position thereof.

The bonding position of the halogenotriazine group which is a reactive group may be any optional position of the benzene ring except the bonding position of the sulfo group which corresponds to the 2-position with respect to the azo group, but is usually at the 4-or 5-position, and preferably the 5-position with respect to the bonding position of the azo group.

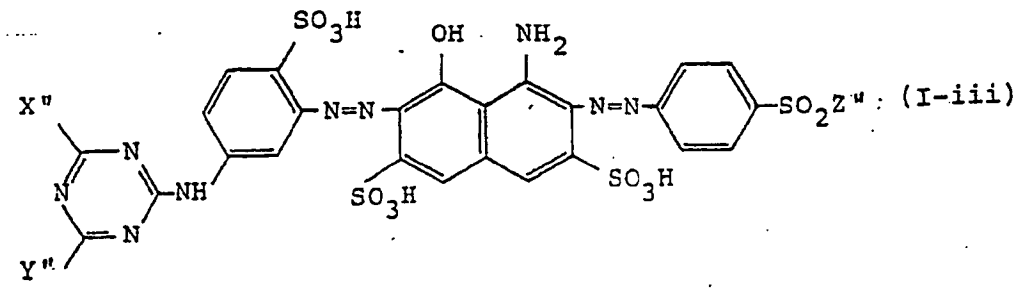
The water-soluble disazo colorants of this invention are preferably represented, in the form of free acid, by formula (I-ii)



(I-ii)

wherein X' represents a chlorine atom or a fluorine atom; Y' represents a group represented by $-OR^{1'}$ or $-O-R^{2'}-OR^{3'}$ (wherein $R^{1'}$ represents an alkyl group having 1 to 4 carbon atoms, which may be substituted by a hydroxyl group, a cyano group or a halogen atom; $R^{2'}$ represents an alkylene group having 1 to 4 carbon atoms and $R^{3'}$ represents an alkyl group having 1 to 4 carbon atoms, which may be substituted by a hydroxyl group); and Z' represents $-CH=CH_2$, $-CH_2CH_2Cl$, or $-CH_2CH_2OSO_3H$.

Furthermore, the water-soluble disazo colorants of this invention are particularly preferably represented, in the form of free acid, by formula (I-iii)



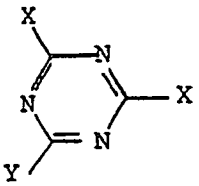
(I-iii)

wherein X" represents a chlorine atom or a fluorine atom; Y" represents a group represented by -OR$^{1"}$ or -O-R$^{2"}$-OR$^{3"}$ (wherein R$^{1"}$ and R$^{3"}$ each represents an alkyl group having 1 to 4 carbon atoms, and R$^{2"}$ represents an alkylene group having 1 to 4 carbon atoms) and Z" represents -CH=CH$_2$, -CH$_2$CH$_2$Cl, or -CH$_2$CH$_2$OSO$_3$H.

The disazo colorants of this invention are present in the form of the free acid or the form of a salt thereof. As the salts thereof, there are usually alkali metal salts and alkaline earth metal salts and of these salts, lithium salts, sodium salts, and potassium salts are particularly preferred.

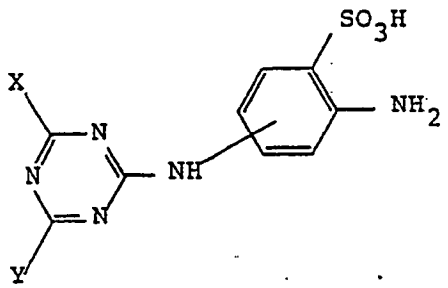
The disazo colorants of this invention shown by formula (I) described above can be produced by the following methods.

For example, by condensing 1 mole of 2,4-diaminobenzenesulfonic acid and 1 mole of a triazine compound represented by formula (II)



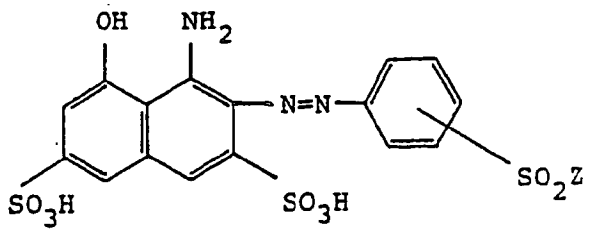
(II)

(wherein X and Y have the same significance as defined in formula (I))
in an aqueous medium, a compound represented by formula (III) is obtained;



(III)

(wherein X and Y have the same significance as defined in formula (I)). Then, after diazotizing the compound of formula (III) thus obtained, the diazotized compound is coupled with 1 mole of a monoazo compound represented by formula (IV)



(IV)

(wherein Z has the same significance as defined in formula (I)), in an alkaline condition to provide the desired disazo colorant. For obtaining the disazo colorant from a reaction mixture, a salting out method is usually used but the reaction mixture may be spray-dried as it is.

The disazo colorant of this invention can be widely utilized as dyestuff for dyeing fibers, cloths, etc., colorant for coloring papers, synthetic resins, etc., and colorant for ink-jet printing ink, etc., but are excellent in adaptability as dyestuff for dyeing fibers, cloths, etc.

In the case of using the disazo colorant of this invention for dyeing fibers, examples of fibers being dyed are cellulose series fibers such as cotton, viscose rayon, cupraammonium rayon, hemp, and nitrogen-containing fibers such as polyamide fibers, wool and silk, but cellulose fibers are particularly preferred. Also, these fibers may be used as mixed fibers with polyester, triacetate or polyacrylonitrile fibers. Furthermore, mixed fibers of cellulose fibers and nitrogen-containing fibers can be used in this invention.

For dyeing cellulose fibers or nitrogen-containing fibers using the disazo colorants of this invention, the fibers can be dyed according to an ordinary method in the existence of an acid composed of an inorganic alkali such as sodium hydrogencarbonate or sodium carbonate, or an organic base such as triethylamine.

As a dyeing method in this invention, a dip dyeing is particularly suitable and in this case, the dyeing temperature is suitable from about 40°C to 80°C.

Furthermore, the disazo colorant of this invention can be used for other dyeing methods which can be applied in the case of using vinylsulfone type reactive dyes, such as a cold pad batch method, pad stream method and discharge printing method.

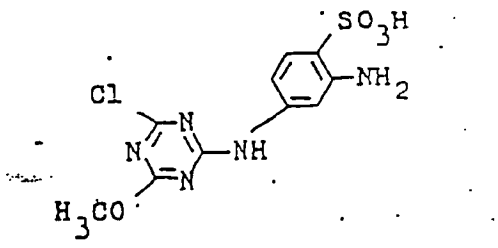
The disazo colorants of this invention are water-soluble navy blue series colorants having both a vinylsulfone type reactive group and a mono-or di-halogenotriazine type reactive group in the structure. The disazo colorants of this invention can dye cellulose fiber or nitrogen-containing fibers densely and with good level dyeing property, are excellent in build-up property, and further excellent in color fastnesses to light, chlorine and perspiration under sunlight.

The present invention is hereinafter described in greater detail with reference to examples, which are not to be construed as limiting the scope thereof.

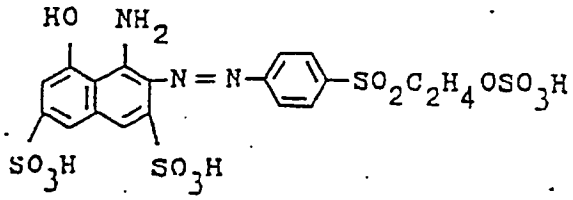
EXAMPLE 1

Proportion of a colorant

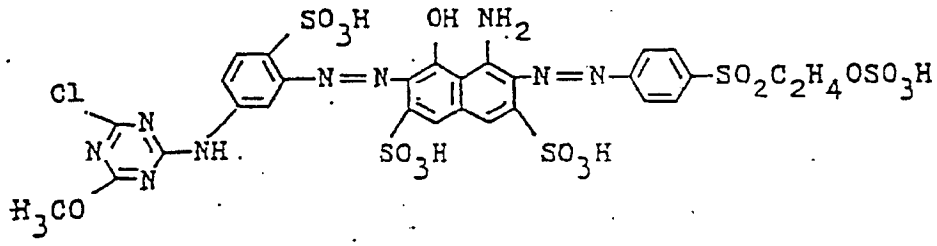
After diazotizing 1 mole of an amino compound shown by the following structure



in an ordinary manner, the diazotized compound was coupled with 1 mole of a monoazo compound shown by the following formula



in an aqueous medium at temperature of from 0°C to 5°C and at pH of from 7 to 8. After the coupling reaction was over, the reaction mixture obtained was salted out with a potassium chloride, filtered, and dried to provide a disazo colorant having the following formula (shown by the form of free acid) and the maximum absorption wavelength of 598 nm (water).



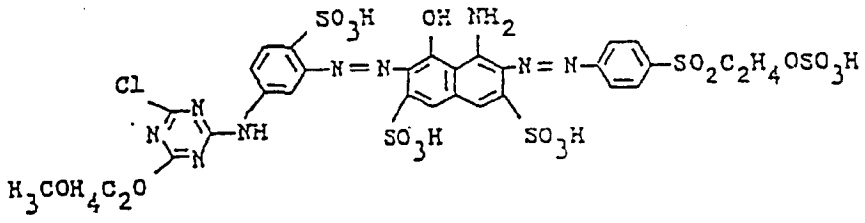
Dyeing Test

0.2 g of the disazo colorant obtained as described above was dissolved in 200 ml of water and after adding thereto 10 g of Glauber's salt and dissolving therein, 10 g of an unmercerized knitted cotton was immersed in the dyeing bath thus prepared following by raising the temperature thereof to 60°C over a period of 30 minutes. Thereafter, 3.0 g of sodium carbonate was added thereto and after performing dyeing for one hour at 60°C, the dyed product was washed with water, soaped with water, and dried to provide a product dyed in navy blue color.

The dyed product thus obtained was uniformly and densely dyed, and was excellent in light fastness (JIS L-0842) as grade 4 to 5, was very excellent in chlorine fastness (effective chlorine of 20 ppm according to JIS L-0884) as grade 4 to 5, and was excellent in perspiration fastness under sunlight (by alkali method of JIS L-0888A) as Grade 3.

EXAMPLE 2

After dissolving 0.2 g of a disazo colorant shown, in the form of free acid, by the following structural formula:



and having the maximum absorption wavelength of 598 nm (water) in 200 ml of water, 8 g of Glauber's salt was added thereto and dissolved therein and 10 g of an unmercerized knitted cotton was immersed in the

dyeing bath thus formed followed by raising the temperature to 50°C over a period of 30 minutes. Thereafter, 3.0 g of sodium carbonate was added thereto and after dyeing for one hour at 50°C, the dyed product was washed with water, soap d, washed with water, and dried to provide a product dyed in navy blue color. The dyed product thus obtained was uniformly and very densely dyed, was excellent in light fastness (JIS L-0842) as grade 4 to 5, was very excellent in chlorine fastness (effective chlorine of 20 ppm according to JIS L-0884), and further was excellent in perspiration fastness under sunlight (by alkali method of JIS L-0888A) as grade 3.

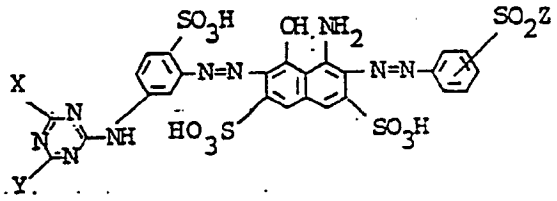
The disazo colorant used in the Example 2 was produced according to the same manner described in Example 1.

EXAMPLE 3

When the disazo colorants of this invention shown in Table 1 described below (shown in the forms of free acids) were prepared according to the same method as shown in Example 1 and cotton cloths were dyed using the colorants by the same manner as in Example 1, uniformly and densely dyed products were obtained.

These dyed products obtained were excellent in light fastness (JIS-L0842) as grade 4 to 5, in chlorine fastness (effective chlorine of 20 ppm according to JIS L-0884) as grade 4 to 5, and in perspiration fastness under sunlight (an alkali method of JIS-L-0888A) as grade 3.

Table 1



No.	-X	-Y	$-C_6H_4-SO_2Z$	Tone of cotton cloth	λmax (water) nm
3-1	-Cl	$-OC_2H_5$	$-C_6H_4-SO_2C_2H_4OSO_3H$	Navy blue	598
3-2	-Cl	$-OC_2H_4Cl$	$-C_6H_4-SO_2C_2H_4OSO_3H$	"	598
3-3	-Cl	$-OC_2H_4OH$	$-C_6H_4-SO_2C_2H_4OSO_3H$	"	598
3-4	-Cl	$-OC_2H_4OC_2H_5$	$-C_6H_4-SO_2C_2H_4OSO_3H$	"	598
3-5	-F	$-OCH_3$	$-C_6H_4-SO_2C_2H_4OSO_3H$	"	598
3-6	-Cl	$-OC_2H_4CN$	$-C_6H_4-SO_2CH=CH_2$	"	603
3-7	-Cl	$-OC_3H_6OCH_3$	$-C_6H_4-SO_2CH_2CH_2Cl$	"	601
3-8	-Cl	$-OC_4H_8OCH_3$	$-C_6H_3(SO_2C_2H_4OSO_3H)-$	"	596
3-9	-Br	$-OC_3H_6Cl$	$-C_6H_4-SO_2C_2H_4OSO_3H$	"	588

Table 1 (cont'd)

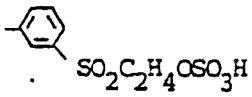
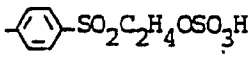
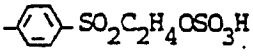
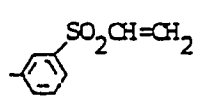
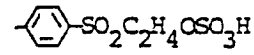
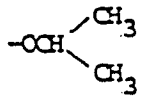
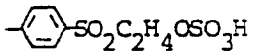
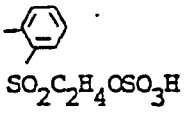
No.	-X	-Y		Tone of cotton cloth	λmax (water) nm
3-10	-Cl	$-OC_3H_6CN$		Navy blue	588
3-11	-F	$-OC_2H_4OCH_3$		"	599
3-12	-Cl	-Cl		"	603
3-13	-Cl	$-OCH_2CH=CH_2$	"	"	598
3-14	-Cl	$-SCH_3$	"	"	597
3-15	-F	$-OC_2H_4OC_2H_4OH$	"	"	598
3-16	-Cl	$-SC_2H_4OCH_3$		"	595
3-17	-Cl	$-OC_2H_4OC_4H_9$		"	598
3-18	-Cl		"	"	598
3-19	-F	"	"	"	598

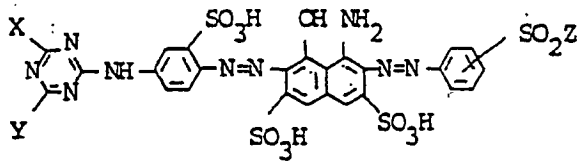
Table 1 (cont'd)

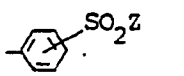
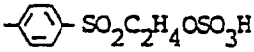
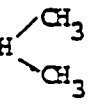
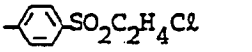
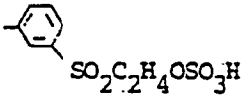
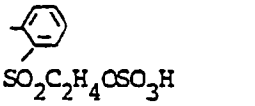
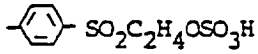
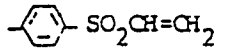
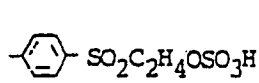
No.	-X	-Y		Tone of cotton cloth	λmax (water) nm
3-20	-Br	$-SC_4H_9$		Navy blue	597
3-21	-Cl	$-OC_8H_{17}$	"	"	598
3-22	-F	$-OC_6H_{13}$	"	"	598
3-23	-Cl	$-OC_2H_4OC_5H_{11}$		"	596

EXAMPLE 4

The disazo colorants of this invention shown in Table 2 (shown in the forms of free acids) were prepared according to the same method as shown in Example 1 and cotton cloths were dyed with the colorant by the methods as in Example 1. Thus, uniformly and densely dyed products were obtained. Also, these dyed products were excellent in light fastness (JIS L-0842) as grade 4 to 5⁻, chlorine fastness (effective chlorine of 20 ppm according to JIS L-0884) as grade 4 to 5, and perspiration fastness under sunlight (alkali method of JIS L-0888A) as grade 3.

Table 2



No.	-X	-Y		Tone of cotton cloth	λmax (water) nm
4-1	-Cl	$-OCH_3$		Greenish navy blue	625
4-2	"		"	"	625
4-3	"	-Cl	"	"	627
4-4	"	$-OCH_2CH=CH_2$		"	625
4-5	-F	$-OCH_3$		"	624
4-6	"	$-OC_3H_6OC_3H_6OH$		"	624
4-7	"	$-SC_6H_{13}$		"	623
4-8	-Cl	$-OC_3H_6Cl$		"	624
4-9	-Cl	$-OC_2H_5$		"	624
4-10	-Br	$-OC_4H_8OCH_3$	"	"	624

EXAMPLE 5

Dyeing Test

A padding bath composed of the following composition was prepared:

Padding Bath Composition:

Colorant described in Example 1	80 g
Urea	100 g
Sodium Alginate	1 g
Sodium Carbonate	20 g
Water	balance
Total	1,000 ml

Then, a cotton broad cloth (#40, with mercerization) was dipped in the padding bath and after squeezing the cloth at a squeezing rate of 80%, the cloth was pre-dried for 2 minutes at 100°C. Thereafter, the cloth was subjected to fixing treatment for 3 minutes at 150°C and then washed with water, soaped, washed with water, and dried to provide a dyed product of navy blue color.

The dyed product obtained by using the colorant of this invention was dyed uniformly and very densely, was excellent in light fastness (JIS L-0842) as grade 5, was very excellent in chlorine fastness (effective chlorine of 20 ppm according to JIS L-0884) as grade 4 to 5, and was excellent in perspiration fastness under sunlight (alkali method of JIS L-0888A) as grade 3.

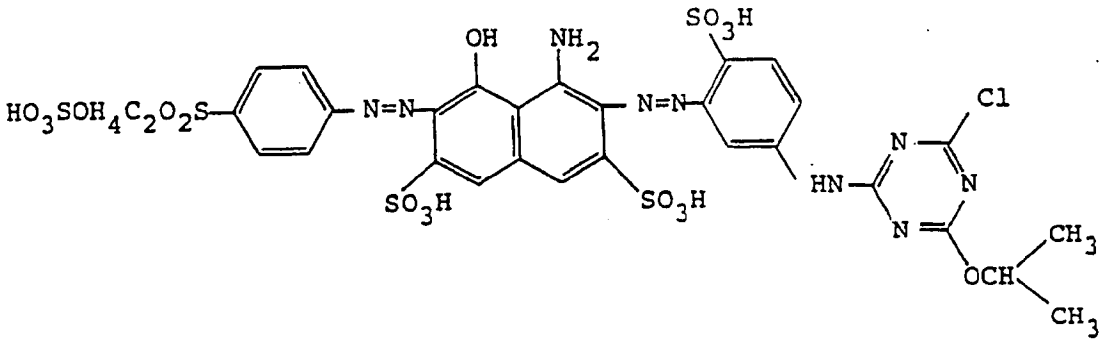
COMPARATIVE EXAMPLE 1

In 200 ml of water was dissolved 0.2 g or 0.8 g of a disazo colorant described below and 10 g of Glauber's salt was dissolved in the solution to provide each dyeing bath. 10 g of unmercerized cotton knitted fabric was dipped in the dyeing bath and the temperature thereof was raised to 60°C over a period of 30 minutes. Then, 3.0 g of sodium carbonate was added thereto and after dyed the fabric for one hour at 60°C, the fabric was washed with water, soaped, washed with water, and dried to provide each dyed product (dyed fabric) of navy blue color.

Disazo colorant used for the Comparative Example are as follows:

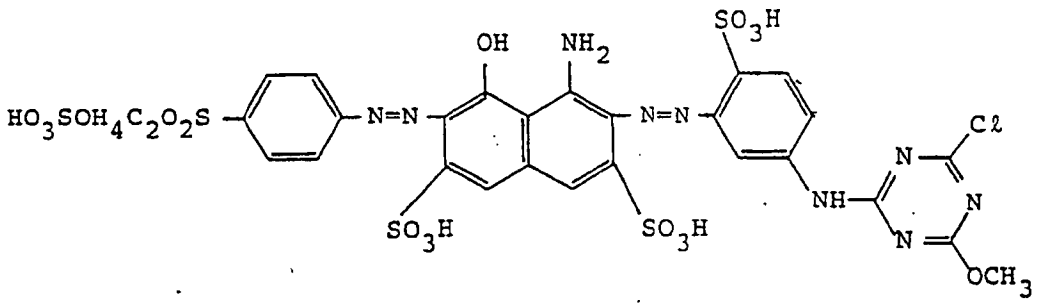
Disazo Colorant 1 of the Invention:	Colorant described in Example 1.
Disazo Colorant 2 of the Invention:	Colorant described in Example 2.

Comparative Disazo Colorant 1:



(corresponding to the sulfate compound described in Example 1 of Japanese Patent Application (OPI) No. 118459/86)

Comparative Disazo Colorant 2:



The surface reflectance of each of these dyed fabrics was measured by a color difference meter (made by Nippon Denshoku Kogyo K.K.) to determine a degree of exhaustion and exhaustion property and build-up property were calculated by the following equations.

Exhaustion Property = A/B x 100

A: Degree of exhaustion of each dyed fabric obtained using each disazo colorant.

B: Degree of exhaustion of the dyed fabric obtained using the disazo colorant 1 of the invention.

Build-Up Property = C/D x 100

C: Degree of exhaustion of each dyed fabric obtained using 0.8 g of each disazo colorant.

D: Degree of exhaustion of each dyed fabric obtained using 0.2 g of each disazo colorant.

The results obtained are shown in Table 3 below.

Also, various color fastnesses were evaluated about each dyed fabric obtained using 0.2 g of each disazo colorant and the results obtained are also shown in Table 3.

Table 3

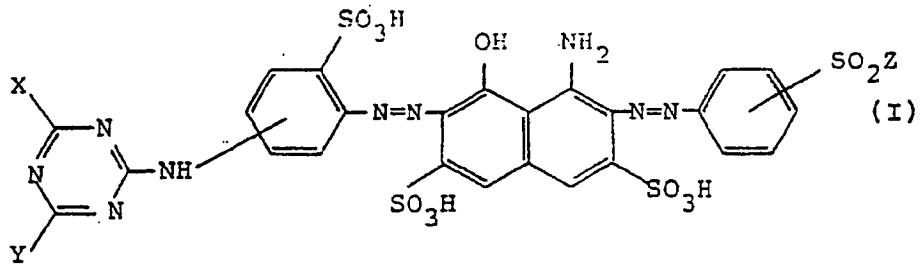
Disazo Colorant	(a) (%)	(b) (%)	(c)	(d) (grade)	(e)
Disazo Colorant 1 of the Invention	100*	325	4-5	4-5	3
Disazo Colorant 2 of the Invention	98	320	4-5	4-5	3
Comparative Disazo Colorant 1	94	265	4-5	2	2
Comparative Disazo Colorant 2	87	250	4-5	2	2

(*): Standard
(a): Exhaustion Property
(b): Build-Up Property
(c): Light fastness JIS L-0842
(d): Chlorine fastness JIS L-0884 (effective chlorine 20 ppm)
(e): Perspiration fastness under sunlight JIS L-0888A Method (alkali).

While the invention has been described in detail and with reference to specific embodiments thereof, it will be apparent to one skilled in the art that various changes and modifications can be made therein without departing from the spirit and scope thereof.

Claims

1. Water-soluble disazo colorants represented, in the form of the free acid, by the formula (I)



(I)

wherein, X represents a halogen atom; Y represents a chlorine atom or a group represented by $-OR^1$, $-SR^1$, $-O-R^2-OR^3$ or $-S-R^2-OR^3$ (wherein R^1 represents an alkyl group which may be substituted by a hydroxyl group, a cyano group or a halogen atom, or an alkenyl group; R^2 represents an alkylene group and R^3 represents an alkyl group which may be substituted by a hydroxyl group); and Z represents $-CH=CH_2$, $-CH_2CH_2Cl$, or $-CH_2CH_2OSO_3H$.

2. The water-soluble disazo colorants as in claim 1, wherein Y is a chlorine atom or a group represented by $-OR^1$, $-SR^1$, $-O-R^2-OR^3$ or $-S-R^2-OR^3$ (wherein R^1 is an alkyl group having 1 to 8 carbon atoms which may be substituted by a hydroxyl group, a cyano group or a halogen atom, or an alkenyl group having 3 or 4 carbon atoms; R^2 is an alkylen group having 1 to 4 carbon atoms and R^3 is an alkyl group having 1 to 8 carbon atoms which may be substituted by a hydroxyl group).

3. The water-soluble disazo colorants as in claim 1, wherein Y is a chlorine atom or a group represented by $-OR^1$, $-SR^1$, $-O-R^2-OR^3$ or $-S-R^2-OR^3$ (wherein R^1 is an alkyl group having 1 to 4 carbon atoms which may be substituted by a hydroxyl group, a cyano group or a halogen atom, or an alkenyl group having 3 or 4 carbon atoms; R^2 is an alkylene group having 1 to 4 carbon atoms and R^3 is an alkyl group having 1 to 4 carbon atoms which may be substituted by a hydroxyl group).

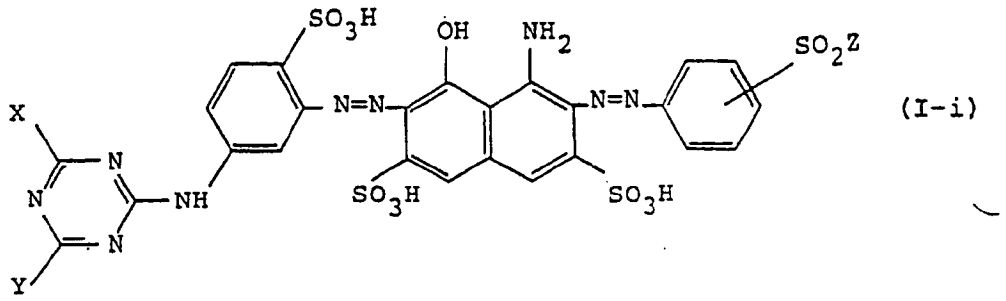
4. The water-soluble disazo colorants as in claim 1, wherein X is a chlorine atom or a fluorine atom.

5. The water-soluble disazo colorants as in claim 1, wherein Y is a group represented by $-OR^1$ or $-O-R^2-OR^3$ (wherein R^1 is an alkyl group which may be substituted by a hydroxyl group, a cyano group or a halogen atom; R^2 is an alkylene group and R^3 is an alkyl group which may be substituted by a hydroxyl group).

6. The water-soluble disazo colorants as in claim 1, wherein Y is a group represented by $-OR^1$ or $-O-R^2-OR^3$ (wherein R^1 and R^3 are an alkyl group having 1 to 4 carbon atoms and R^2 is an alkylene group having 1 to 4 carbon atoms).

7. The water-soluble disazo colorants as in claim 1, wherein Y is a group represented by $-OR^1$ (wherein R^1 is an alkyl group having 1 to 4 carbton atoms).

8. The water-soluble disazo colorants as in claim 1, wherein the colorants are represented, in the form of the free acid, by the formula (I-i)

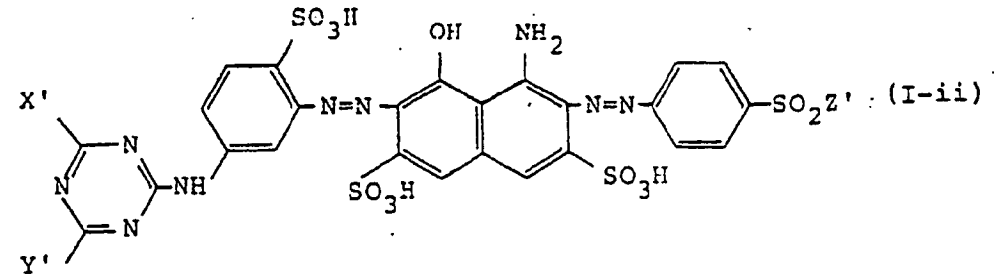


(I-i)

wherein, X, Y and Z are as defined in Claim 1.

9. The water-soluble disazo colorants as in claim 1, wherein the group shown by $-SO_2Z$ is attached at the paraposition of the benzene ring with respect to the bonding position of the azo group.

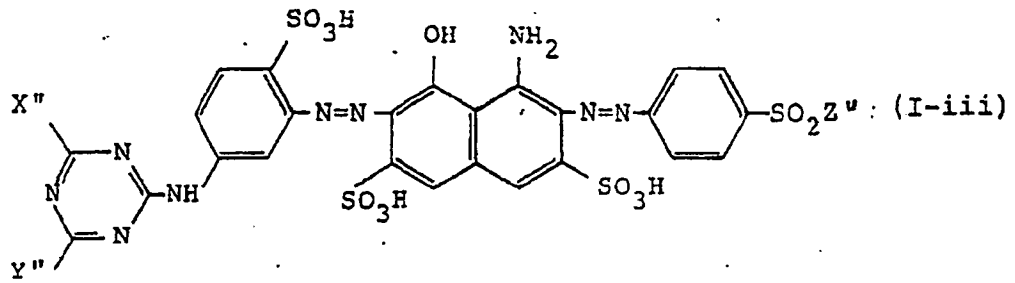
10. The water-soluble disazo colorants as in claim 1, wherein the colorants are represented, in the form of the free acid, by the formula (I-ii)



(I-ii)

wherein X' represents a chlorine atom or a fluorine atom; Y' represents a group represented by $-OR^{1'}$ or $-O-R^{2'}-OR^{3'}$ (wherein $R^{1'}$ represents an alkyl group having 1 to 4 carbon atoms, which may be substituted by a hydroxyl group, a cyano group or a halogen atom; $R^{2'}$ represents an alkylene group having 1 to 4 carbon atoms and $R^{3'}$ represents an alkyl group having 1 to 4 carbon atoms, which may be substituted by a hydroxyl group); and Z' represents $-CH=CH_2$, $-CH_2CH_2Cl$, or $-CH_2CH_2OSO_3H$.

11. The water-soluble disazo colorants as in claim 1, wherein the colorants are represented, in the form of the free acid, by the formula (I-iii)



: (I-iii)

wherein X" represents a chlorine atom or a fluorine atom; Y" represents a group represented by $-OR^{1"}$ or $-O-R^{2"}-OR^{3"}$ (wherein $R^{1"}$ and $R^{3"}$ each represents an alkyl group having 1 to 4 carbon atoms, and $R^{2"}$ represents an alkylene group having 1 to 4 carbon atoms) and Z" represents $-CH=CH_2$, $-CH_2CH_2Cl$, or $-CH_2CH_2OSO_3H$.

12. The use of the disazo colorants of the formula (I) according to claim 1 for dyeing cellulose and nitrogen containing fibers.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 87 11 5256

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	DE-A-3 113 473 (NIPPON KAYAKU) * Claim 1; examples 9,29,30; Seite 11, 1st paragraph * -----	1-8,12	C 09 B 62/09 C 09 B 62/513 D 06 P 1/38
			TECHNICAL FIELDS SEARCHED (Int. Cl.4) C 09 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	03-12-1987	GINESTET M.E.J.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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